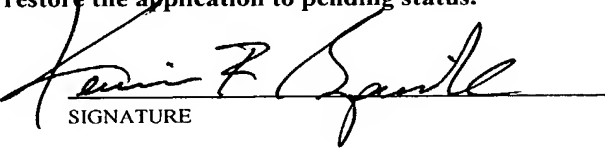


15 UC20 Rec'd PCT/PTO 13 MAR 2002

dc-304666*FORM PTO-1390 TRADEMARK OFFICE (REV 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND		ATTORNEY'S DOCKET NUMBER <div style="text-align: center; font-weight: bold; font-size: 1.2em;">449122024900</div>	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. § 371				U.S. APPLICATION NO. (If known, see 37 CFR 1.5) <div style="text-align: center; font-size: 1.5em; font-weight: bold;">10/070944</div> <div style="text-align: center; font-size: 0.8em;">Not yet assigned</div>	
INTERNATIONAL APPLICATION NO. <div style="text-align: center; font-weight: bold;">PCT/DE00/03115</div>		INTERNATIONAL FILING DATE <div style="text-align: center; font-weight: bold;">September 7, 2000</div>		PRIORITY DATE CLAIMED <div style="text-align: center; font-weight: bold;">September 13, 1999</div>	
TITLE OF INVENTION <div style="text-align: center; font-weight: bold;">COMMUNICATIONS CONTROLLER FOR COMMUNICATION WITH TELEPHONY OVER INTERNET PROTOCOL</div>					
APPLICANT(S) FOR DO/EO/US <div style="text-align: center; font-weight: bold;">Markku KORPI et al.</div>					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:					
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (PCT Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input checked="" type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input checked="" type="checkbox"/> An English language translation of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)). <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)). <ol style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). 					
Items 11. to 16. below concern document(s) or information included:					
<ol style="list-style-type: none"> 11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. 14. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 15. <input checked="" type="checkbox"/> A substitute specification. 16. <input type="checkbox"/> A change of power of attorney and/or address letter. 17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825. 18. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4). 19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). 20. <input checked="" type="checkbox"/> Other items: 1) Application Data Sheet; 2) Int'l Search Report; 3) IPER; 4) Return receipt postcard. 					
<div style="text-align: center; font-weight: bold;">CERTIFICATE OF HAND DELIVERY</div> <p>I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on March 13, 2002.</p> <div style="text-align: center; margin-top: 20px;"> <div style="text-align: center;">Melissa Garton</div> </div>					

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) Not yet assigned 10/070944		INTERNATIONAL APPLICATION NO. PCT/DE00/03115		ATTORNEY DOCKET NO. 449122024900	
21. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO.....\$1,040.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO.....\$890.00 International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....\$740.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provision of PCT Article 33(1)-(4)\$710.00 International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4)\$100.00				CALCULATIONS PTO USE ONLY	
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$0	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	- 20 =		x \$18.00	\$0	
Independent claims	- 3 =		x \$84.00	\$0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00	\$0	
TOTAL OF ABOVE CALCULATIONS =				\$890.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$0	
SUBTOTAL =				\$890.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				+	\$0
TOTAL NATIONAL FEE =				\$890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				+	\$0
TOTAL FEES ENCLOSED =				\$890.00	
				Amount to be refunded:	\$
				charged:	\$
a. <input checked="" type="checkbox"/> Please charge my Deposit Account No. 03-1952 (referencing Docket No. 449122024900) in the amount of \$890.00 to cover the above fees. A duplicate copy of this sheet is enclosed. b. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment to Deposit Account No. 03-1952 (referencing Docket No. 449122024900).					
<p>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>SEND ALL CORRESPONDENCE TO:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Kevin R. Spivak Morrison & Foerster LLP 2000 Pennsylvania Avenue, N.W. Washington, D.C. 20006-1888</p> </div> <div style="width: 45%; text-align: center;">  SIGNATURE Kevin R. Spivak Registration No. 43,148 March 13, 2002 </div> </div>					

Application Data Sheet**Inventor Information**

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Application Information

Title Line One:
Title Line Two:
Title Line Three:
Total Drawing Sheets:
Formal Drawings?:
Application Type:
Docket Number:

COMMUNICATIONS CONTROLLER FOR
COMMUNICATION WITH TELEPHONY
OVER INTERNET PROTOCOL
3
yes
National Phase
449122024900

Representative Information

Representative Customer Number: 25227

Continuity Information

This application is a:
> Application One:
Filing Date:

371 of
PCT/DE00/03115
September 7, 2000

Prior Foreign Applications

Foreign Application One:
Filing Date:
Country:
Priority Claimed:

19943777.7
September 13, 1999
Germany
yes

10070014 080802
10/070944

JC13 Rec'd PCT/PTO 13 MAR 2002

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on March 13, 2002.


Melissa Garton

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Markku KORPI et al.

Serial No.: Not yet assigned

Examiner: Not yet assigned

Filing Date: March 13, 2002

Group Art Unit: Not yet assigned

For: COMMUNICATIONS
CONTROLLER FOR
COMMUNICATION WITH
TELEPHONY OVER INTERNET
PROTOCOL

PRELIMINARY AMENDMENT

BOX PCT

Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend this application as follows:

In the Claims:

Please cancel claims 1-9.

Please add new claims 10-14 as follows:

10. (New) A communications controller for communication operations which arrive at a terminal device for telephony over Internet protocol, comprising:

a device which compares a received identification of a calling subscriber with corresponding entries of a communication partner file of a called subscriber,

the device provides a procedure to handle the incoming call in the communication partner file if the calling subscriber is recognized as a communication partner included in the communication partner file, and

if the calling subscriber is not recognized as included in the communication partner file, the device provides a procedure to handle the incoming call.

11. (New) The communications controller as claimed in claim 1, wherein the communications controller is located in the terminal device.

12. (New) The communications controller as claimed in claim 1, wherein the communications controller is located in another device which is assigned to an IP network and which the terminal device for telephony over Internet protocol is configured for connection.

13. (New) The communications controller as claimed in claim 3, the device assigned to an IP network being a proxy module with a representative function for the terminal devices for telephony over Internet protocol which is configured for connection to the IP network.

14. (New) A method of controlling communication operations which arrive at a terminal device for telephony over Internet protocol, comprising:

comparing a received identification of a calling subscriber with corresponding entries of a communication partner file of a called subscriber; and

providing a procedure to handle the incoming call in the communication partner file if the calling subscriber is recognized as a communication partner included in the communication partner file, and

if the calling subscriber is not recognized as included in the communication partner file, providing a procedure to handle the incoming call.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

REMARKS

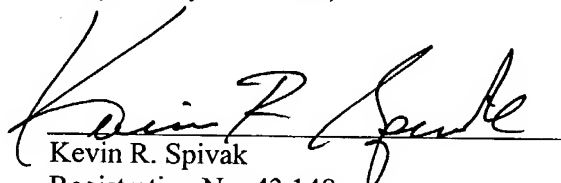
Amendments to the specification have been made and are submitted herewith in the attached Substitute Specification. We have included both a clean copy of the specification and a marked-up version showing the changes made. The claims and abstract have been amended herewith in the Preliminary Amendment. All amendments have been made to place the application in proper U.S. format and to conform with proper grammatical and idiomatic English. None of the amendments herein are made for reasons related to patentability. No new matter has been added.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. **449122024900**. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: March 13, 2002


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

For the convenience of the Examiner, the changes made are shown below with deleted text in strikethrough and added text in underline.

In the Claims:

Please cancel claims 1-9.

Please add new claims 10-14 as follows:

10. (New) A communications controller for communication operations which arrive at a terminal device for telephony over Internet protocol, comprising:
a device which compares a received identification of a calling subscriber with corresponding entries of a communication partner file of a called subscriber,
the device provides a procedure to handle the incoming call in the communication partner file if the calling subscriber is recognized as a communication partner included in the communication partner file, and
if the calling subscriber is not recognized as included in the communication partner file, the device provides a procedure to handle the incoming call.
11. (New) The communications controller as claimed in claim 1, wherein the communications controller is located in the terminal device.
12. (New) The communications controller as claimed in claim 1, wherein the communications controller is located in another device which is assigned to an IP network and which the terminal device for telephony over Internet protocol is configured for connection.
13. (New) The communications controller as claimed in claim 3, the device assigned to an IP network being a proxy module with a representative function for the terminal devices for telephony over Internet protocol which is configured for connection to the IP network.
14. (New) A method of controlling communication operations which arrive at a terminal device for telephony over Internet protocol, comprising:

comparing a received identification of a calling subscriber with corresponding entries of a communication partner file of a called subscriber; and

providing a procedure to handle the incoming call in the communication partner file if the calling subscriber is recognized as a communication partner included in the communication partner file, and

if the calling subscriber is not recognized as included in the communication partner file, providing a procedure to handle the incoming call.

In the Abstract:

Please replace the Abstract with the substitute Abstract attached hereto.

**COMMUNICATIONS CONTROLLER FOR COMMUNICATION WITH TELEPHONY
OVER INTERNET PROTOCOL**Abstract

A communications controller for communication operations which arrive at a terminal device for telephony over Internet protocol. The communications controller includes a device which, with each incoming call, compares a received identification of the calling subscriber with entries of a communication partner file of the called subscriber, which arranges for a procedure for handling the incoming call that is stored in this file to be implemented, and which, if the calling subscriber is not recognized as included in the communication partner file, arranges for a procedure for handling the incoming call that is provided for this case to be implemented.

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COMMUNICATIONS CONTROLLER FOR COMMUNICATION WITH
TELEPHONY OVER INTERNET PROTOCOL

CLAIM FOR PRIORITY

5 This application claims priority to International Application No. PCT/DE00/03115 which was published in the German language on September 7, 2000.

TECHNICAL FIELD OF THE INVENTION

10 The invention relates to a communications controller, and in particular, to a communications controller for calls arriving at a terminal device which operates in accordance with the telephony over Internet protocol, an identification of the calling
15 subscriber or terminal being received along with the incoming calls.

BACKGROUND OF THE INVENTION

20 In the area of private branch exchanges, there is typically a central communications controller for establishing the procedure for handling calls coming to a terminal. This provides the "selective incoming-call protection" facility, which arranges for a diversion of calls coming from selected subscribers to another
25 terminal or to a spoken-message and/or voice-recording system and puts through incoming calls from other subscribers. Publication DE 43 30 755 C2, in the case of central communication controllers, discloses incoming calls from selected subscribers to be put
30 through to the terminal and all other incoming calls to be diverted to another terminal or to a spoken-message and/or voice-recording system.

35 In a PC, and consequently in a terminal for telephony over Internet protocol, there is conventionally a communication partner file, which contains a number of data records with data on communication partners of the subscriber to which the terminal is assigned. Each data record contains an entry for the name of the communication partner and one

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or more communication addresses. If appropriate, such a data record may also contain additional information on the respective communication partner.

5

SUMMARY OF THE INVENTION

In one embodiment of the invention, there is a communications controller for communication operations which arrive at a terminal device for telephony over Internet protocol. The controller includes, for example, a device which compares a received identification of a calling subscriber with corresponding entries of a communication partner file of a called subscriber, the device provides a procedure to handle the incoming call in the communication partner file if the calling subscriber is recognized as a communication partner included in the communication partner file, and if the calling subscriber is not recognized as included in the communication partner file, the device provides a procedure to handle the incoming call.

In another aspect of the invention, the communications controller is located in the terminal device.

In another aspect of the invention, the communications controller is located in another device which is assigned to an IP network and which the terminal device for telephony over Internet protocol is configured for connection.

In another aspect of the invention, the device assigned to an IP network being a proxy module with a representative function for the terminal devices for telephony over Internet protocol which is configured for connection to the IP network.

In another embodiment of the invention, there is a method of controlling communication operations which arrive at a terminal device for telephony over Internet protocol. The method includes, for example, comparing a received identification of a calling subscriber with corresponding entries of a communication partner file

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of a called subscriber, and providing a procedure to handle the incoming call in the communication partner file if the calling subscriber is recognized as a communication partner included in the communication partner file, and if the calling subscriber is not recognized as included in the communication partner file, providing a procedure to handle the incoming call.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is explained in more detail below on the basis of an exemplary embodiment with reference to
5 the figures.

Figure 1 shows an exemplary embodiment of a flow diagram for realizing a selective call diversion as a proxy function in an H.323 network.

Figure 2 shows an exemplary embodiment of an H.323 proxy used in the method according to figure 1 in a
10 schematic block representation of an extended protocol layer model (protocol stack).

Figure 3 shows a partial detail of a communications network in accordance with the standard
15 ITU-T H.323 with endpoints, a gatekeeper function, a database and a proxy function in a schematic block representation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

20 The invention relates to a communications controller for calls arriving at a terminal device which operates in accordance with the telephony over Internet protocol, an identification of the calling subscriber or terminal being received along with the
25 incoming calls. Calls directed to a terminal device for telephony over Internet protocol are usually put through to the called terminal device by an Internet protocol network, i.e. a data network operating on the basis of an Internet protocol, which operates for
30 example in accordance with the standard ITU-T H.323. Provided in the called terminal device is a

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communications controller, for which there is an established procedure for handling incoming calls. In the simplest case, incoming calls are always put through to be taken by a called subscriber. However, the subscriber may also provide that incoming calls are forwarded to another terminal or to a spoken-message and/or voice-recording device. The handling of incoming calls is in this case independent of the calling subscriber.

10 The present invention discloses an improved communications controller for communication operations which are directed to a terminal device for telephony over Internet protocol.

15 With each incoming call, a communications controller compares a received identification of the calling subscriber with the corresponding entries in a communication partner file of the called subscriber, and inquires about a procedure for handling incoming calls that is stored for the calling subscriber in the communication partner file. If the calling subscriber is stored as a communication partner in the communication partner file, and consequently there is a procedure for handling the incoming call stored in the communication partner file, the communications controller according to the invention arranges for this stored procedure for handling the incoming call to be implemented. If the calling subscriber is not recognized as included in the communication partner file, the communications controller arranges for a procedure for handling the incoming call that is provided for this case to be implemented.

35 In the communication partner file, there may be stored a detailed procedure for handling incoming calls for each communication partner, including a specified account of the exact procedure. Since, however, a communication partner file usually includes considerably more communication partner data records than different ways of handling incoming calls, it may also include for each storage communication partner a

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pointer which points to a file which is assigned to this pointer and contains detailed particulars on how to handle incoming calls.

For terminal devices which can be connected in different network areas, for example for portable terminal devices, an advantageous embodiment comprises a communications controller in the terminal device. This ensures that the communication partner file and the communications controller are available independently of the network area in which the terminal device is connected. In the case of such an embodiment, the terminal device is in the switched-on operating state or put into the operating state when there is an incoming communication operation. If the terminal device is a computer, for example, it is consequently in the switched-on operating state if incoming communication operations are to be handled, or in a power-saving state which at least permits the detection of incoming calls and also allows the terminal device to be put into the active operating state when there is an incoming call.

Another embodiment of a communications controller is includes a device assigned to an Internet protocol network to which the terminal device for telephony over Internet protocol can be connected, the incoming communication operations of which are to be handled by the communications controller. In such a case, the handling of incoming calls for a terminal device is ensured even if the terminal device is switched off or is temporarily not been operated on the Internet protocol network.

Such a device assigned to an Internet protocol network may be realized, for example, in the area of a gatekeeper device of an Internet protocol network subarea. If appropriate, it is possible to use the same hardware device with which the gatekeeper function is also realized by using the corresponding software.

The device which is assigned to an Internet protocol network and within which the communications

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controller can be realized may also be a proxy which represents a representative function for terminal devices for telephony over Internet protocol which can be connected to the said protocol network.

5 If a communications controller according to the invention is realized in a proxy with a representative function for terminal devices, a terminal device can, if it leaves the active operating state, for example is switched off, for example transmit to the gatekeeper responsible for the terminal device a message arranging for the gatekeeper to forward to the proxy calls arriving for the to the terminal device. In the situation mentioned it is also possible for the proxy to arrange for the gatekeeper to forward to the proxy calls arriving for the terminal device. For this purpose, the proxy may, for example, receive from the terminal device a message which indicates whether the terminal device is available for incoming calls. There is also the possibility that the proxy always checks after a certain period of time or at certain points in time the availability of terminal devices for incoming calls, in order that, if they are unavailable, the gatekeeper is informed that calls arriving for this terminal device are to be forwarded to the proxy.

25 It also favorable if, without requesting them, the proxy receives messages concerning changes in state with respect to the availability of terminals and if the proxy additionally checks from time to time the availability of the terminals. This makes it possible to ensure that, even if there is no message concerning a change in state, this change in state is registered after a certain time.

To allow the representation of figure 1 to be explained in a more intelligible way, firstly the H.323 proxy PROXI according to figure 2 and the H.323 communications network according to figure 3 are described.

Communication networks H.323 Net, as represented broadly in figure 3, are known in principle. The

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communications network H.323 Net shown in figure 3 has a number of endpoints A, B, C, D and E, a gatekeeper function GK, a proxy function PROXI and a database DB. A proxy function PROXI, like a gatekeeper function GK, is a logical function within a communications network H.323 Net. A gatekeeper function GK is a logical function for performing standard functions such as address resolution and bandwidth management. Address resolution refers to a calling endpoint D sending to the gatekeeper an alias address of an endpoint E to be called and received from the gatekeeper GK the transport address, that is the Internet protocol address and the port number. The gatekeeper GK knows the volume of traffic with respect to real-time applications within the network area for which it is responsible. If a calling endpoint D sends to the gatekeeper GK a request for a connection with a certain bandwidth, the gatekeeper compares the requested bandwidth with the available bandwidth and, depending on the result of the comparison, sends a message to the calling endpoint A. The network shown in figure 3 differs from the known standard H.323 network by having a database DB for providing communication partner files and a special proxy function PROXI. An embodiment of such a proxy function PROXI is explained in more detail on the basis of an exemplary embodiment of a method according to the invention with reference to figure 1. The structure of such a proxy function PROXI is presented below on the basis of an extended protocol layer model with reference to figure 2.

In figure 2, an exemplary embodiment of an H.323 proxy PROXI is represented in a schematic block representation in the form of an extended protocol layer model.

As usual in networks conforming to ITU-T H.323, the communication of the H.323 proxy PROXI is based on the Internet protocol IP. On the basis of the Internet protocol IP, the protocol stack of the signaling that

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is handling the call control is represented in the center of figure 2.

On the basis of the Internet protocol IP and the signaling protocol TCP, a function module H.225.0
5 conforming to the protocol ITU-T H.225.0 is provided here for the signaling of the basic call control in H.323 networks. Examples of messages of this function module H.225.0 are SETUP and CONNECT.

Also on the basis of the signaling protocol TCP, a
10 function module H.245 conforming to the control protocol ITU-T H.245 is provided. One of the purposes of this function module H.245 is for exchanging TerminalCapability messages, that is for submitting and receiving information with respect to terminal
15 capabilities. What is more, this function module H.245 serves for establishing task allocations, such as master and slave functions, and for opening and closing logical channels serving for user data transmission.

On top of the function module H.225.0 there are
20 function modules of additional facility controllers, such as for example a function module H.450.1 for realizing a specific function and a function module H.450.3 for realizing a call diversion function of the standard ITU-T H.450.

25 In figure 2, a user data stack is represented to the left of the signaling stack just described. This user data stack is also based on the Internet protocol IP, on which there is UDP and on that, in turn, a real-time protocol RTP. In addition to the real-time
30 protocol RTP, the protocol UDP also supports a real-time control protocol RTCP and that part H.225.0 RAS of the control protocol conforming to ITU-T H.225.0 which concerns the areas of registration, administration and status.

35 On the basis of the real-time protocol RTP, there are codecs or at least decoders for audio and video AUDIO, VIDEO. Such audio codecs AUDIO are designed for example to conform to one of the ITU-T standards G.711, G.723.1, G.728. Audio decoders AUDIO are also defined

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by ISO MPEG4. ISO MPEG4 also defines corresponding video decoders VIDEO. When decoders conforming to ISO MPEG4 are used, proprietary coders are possibly contained in an H.323 proxy PROXI.

5 The real-time control protocol RTCP and the codecs or decoders for audio and video AUDIO, VIDEO are controlled by a media controller MEDIA CONTROL, which is responsible inter alia for the interaction of media input means INPUT-DEVICE, provided in the H.323 proxy
10 PROXI, and a media output device that are optionally provided in an H.323 proxy PROXI and are therefore not represented. In this respect, the media input device INPUT-DEVICE are, for example (not shown explicitly in figure 2), cameras for video data, microphones for
15 audio data or interfaces with data sources not included in the H.323 proxy PROXI. An output device (not shown explicitly in figure 2) could be, for example, a loudspeaker for audio data or interfaces with the output device not included in the H.323 proxy PROXI,
20 such as printers or mass storage devices.

The described stack for user data handling RTP, RTCP, H.225.0, AUDIO, VIDEO and MEDIA CONTROL and the described stack for signaling handling H.245, H.225.0, CONFERENCE CONTROLLING, H.450.2, H.450.4 and H.450.5
25 are coupled to an application programming interface API via a coordination function COORDINATION FUNCTION. In this case, the coordination function COORDINATION FUNCTION coordinates the interaction of the units in this stack with the application programming interface
30 API.

Examples of an application programming interface API are TAPI or CAPI. The application programming interface API switches between application programs applications and the coordination function COORDINATION
35 FUNCTION.

In addition to the stacks required for multimedia communication, that is the described stacks for user data handling RTP, RTCP, H.225.0, AUDIO, VIDEO and MEDIA CONTROL and for signaling handling H.245,

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H.225.0, H.450.1, H.450.3 and H.450..., another function module DB/DB Access is shown on the right-hand side in figure 2. This function module DB/DB Access is not based on the Internet protocol IP but is also
5 coupled via the coordination function COORDINATION FUNCTION and the application programming interface API to applications APPLICATIONS. The function module DB/DB Access corresponds for example to an interface of the H.323 proxy PROXI with a database server (not
10 shown), which includes communication partner files. The function module DB/DB Access may, however, also correspond to an interface with a database included in the H.323 proxy PROXI (not shown in figure 2) with communication partner files. If communication partner
15 files are included in a database server, it goes without saying that this can also be accessed using signaling based on ITU-T H.450.

The structure of the function module DB/DB Access is not explicitly presented in figure 2, since
20 corresponding industrial standard interfaces are sufficiently known. Such interfaces may be, for example, JDBC (JAVA Database Connectivity) or ODBC (Open Database Connectivity).

Figure 1 shows basic states, events and the
25 message flow between three endpoints A, B and C of a communications network in accordance with the standard ITU-T H.323, a gatekeeper GK, a database DB and a proxy function which is provided in this communications network and is referred to hereafter as the H.323 proxy
30 PROXI. The exemplary embodiment dealt with in figure 1 assumes that a subscriber to which the endpoint B is assigned wishes for a call diversion to the endpoint C for incoming calls from certain points, including endpoint A. In the present case, a terminal provided
35 at the endpoint B is not ready for operation when a call arrives from the endpoint A:

In the initial state, the function H.323 proxy PROXI, the gatekeeper GK, the database DB and terminals (not shown) assigned to the endpoints A and C are

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respectively in a rest state "idle". A terminal (not shown) assigned to the endpoint B is not in operation.

A subscriber at the endpoint A arranges via the
5 gatekeeper GK for a connection to be set up to an
endpoint B. For this purpose, the message SETUP, for
example conforming to ITU-T H.225, is transmitted from
the endpoint A to the gatekeeper GK, and would usually
be forwarded by the gatekeeper GK to the endpoint B.
10 In the present case, however, the gatekeeper GK
receiving the SETUP message recognizes that the
addressed destination endpoint B is not registered as
available and that a representative address (proxy
address) to an H.323 proxy PROXI has been set up for
15 this endpoint in the event of unavailability.

The gatekeeper GK therefore addresses the SETUP
message from the endpoint A to this H.323 proxy PROXI.
The SETUP message includes the address of the
originally called endpoint B.

20 The H.323 proxy PROXI receives the SETUP message
and checks which procedure is to be used for handling
calls for the endpoint B coming from the endpoint A.
For this purpose, the H.323 proxy PROXI sends a request
to the database DB.

25 As mentioned above, the database DB may either
form a unit with the device realizing the proxy
function PROXI or be spatially separate from it. A
remote database DB can be accessed for example via
interfaces conforming to JDBC (JAVA Database
30 Connectivity) or ODBC (Open Database Connectivity), but
also on the basis of an H.450 signaling. In the
database it is checked within the communication partner
file of the subscriber to which the endpoint B is
assigned how calls arriving from the endpoint A are to
35 be handled in the event of the terminal provided at the
endpoint B not being ready for operation. It is
possibly first checked for this purpose whether there
is an entry with respect to the endpoint A in the

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communication partner file of the subscriber to which the endpoint B is assigned.

5 The database DB transmits to the H.323 proxy PROXI the information found in this check: divert calls from endpoint A for endpoint B to endpoint C.

Then, the H.323 proxy PROXI arranges for a corresponding call diversion to be implemented, in the example represented a call diversion conforming to the
10 ITU-T standard H.450.3. Using H.225.0, the H.323 proxy PROXI transmits for this purpose to the endpoint A a message FACILITY (H.450.3 callReroutingInvoke), invoking the call diversion facility.

15 This message includes the address of the call diversion destination. Although the terminal at the endpoint B is not in operation, this call diversion can be executed by the proxy function. The proxy function is provided for realizing this facility with respect to this terminal.

20 Consequently, the proxy function Proxi arranges for the facility message FACILITY (H.450 callReroutingInvoke) for the endpoint B that is not ready for operation. The endpoint A sends in a manner conforming to the ITU-T standard H.450.3 (for example
25 February 1998 edition) and on the basis of H.225.0 a facility message FACILITY (H.450 callReroutingResult) directly to the H.323 proxy PROXI and then arranges, by a message H.225.0 ReleaseComplete to the H.323 proxy PROXI, for the signaling connection between H.323 proxy
30 PROXI and the endpoint A to be released.

The endpoint A transmits to the endpoint C an H.245 TerminalCapabilitySet message with the data of the endpoint A. In a corresponding way, the endpoint C transmits to the endpoint A an H.245
35 TerminalCapabilitySet message with the data of the endpoint C. What is more, the position of the individual parties involved during the call between the endpoints A and C is established in a manner conforming to H.245 by the exchange of Master/SlaveDetermination

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messages, whereupon a procedure for opening logical channels between the endpoints A and C is executed by means of messages conforming to ITU-T H.245.

- 5 Then logical channels are opened between the endpoints A and C, in order for example to transmit audio or video information. What is more, signaling connections exist between the endpoint A and the endpoint C.

DESCRIPTION

COMMUNICATIONS CONTROLLER FOR COMMUNICATION WITH
TELEPHONY OVER INTERNET PROTOCOL

5

CLAIM FOR PRIORITY

This application claims priority to International Application No. PCT/DE00/03115 which was published in the German language on September 7, 2000.

10

TECHNICAL FIELD OF THE INVENTION

The invention relates to a communications controller, and in particular, to a communications controller for calls arriving at a terminal device which operates in accordance with the telephony over Internet protocol, an identification of the calling subscriber or terminal being received along with the incoming calls.

~~Calls directed to a terminal device for telephony over Internet protocol are usually put through to the called terminal device by an Internet protocol network, that is to say a data network operating on the basis of an Internet protocol, which operates for example in accordance with the standard ITU T H.323. Provided in the called terminal device is a communications controller, for which there is an established procedure for handling incoming calls. In the simplest case, incoming calls are always put through to be taken by a called subscriber. However, the subscriber may also provide that incoming calls are forwarded to another terminal or to a spoken message and/or voice recording device. The handling of incoming calls is in this case independent of the calling subscriber.~~

35

BACKGROUND OF
THE INVENTION

In the area of private branch exchanges, there is typically a known central communications controller for establishing the procedure for handling calls coming to a terminal. This provides the "selective incoming-call protection" facility, which arranges for a diversion of calls coming from selected subscribers to another

40

terminal or to a spoken-message and/or voice-recording system and puts through incoming calls from other subscribers. Furthermore, it is known from Publication DE 43 30 755 C2, in the case of ~~such~~ central communication controllers, ~~for~~ discloses incoming calls from selected subscribers to be put through to the terminal and all other incoming calls to be diverted to another terminal or to a spoken-message and/or voice-recording system.

10 In a PC, and consequently in a terminal for telephony over Internet protocol, there is conventionally a communication partner file, which contains a number of data records with data on communication partners of the subscriber to which the
15 terminal is assigned. Each data record contains an entry for the name of the communication partner and one or more communication addresses. If appropriate, such a data record may also contain additional information on the respective communication partner.

20

SUMMARY OF THE INVENTION

In one embodiment ~~The object of the invention is to specify an improved,~~ there is a communications controller for communication operations which are ~~directed to~~ arrive at a terminal device for telephony over Internet protocol.

The controller includes, for example, a device which ~~invention achieves this object by a communications controller with the features of patent claim 1.~~

~~With each incoming call, a communications controller according to the invention compares a received identification of the~~ a ~~calling subscriber with the corresponding entries in~~ of ~~a communication partner file of the called subscriber and inquires about a procedure for handling incoming calls that is stored for the calling subscriber~~ a called subscriber, the device provides a procedure to handle the incoming call in the communication partner file. ~~If~~ if the calling

subscriber stored recognized as communication partner included in the communication partner file and ~~consequently there is a procedure for handling the incoming call stored,~~ and if the calling subscriber is not recognized as included in the communication partner file, the communications controller according to the invention ~~arranges for this stored procedure for handling the incoming call to be implemented.~~ If the calling subscriber is not recognized as contained device provides a procedure to handle the incoming call.

In another aspect of the invention, the communications controller is located in the terminal device.

In another aspect of the invention, the communications controller is located in another device which is assigned to an IP network and which the terminal device for telephony over Internet protocol is configured for connection.

In another aspect of the invention, the device assigned to an IP network being a proxy module with a representative function for the terminal devices for telephony over Internet protocol which is configured for connection to the IP network.

In another embodiment of the invention, there is a method of controlling communication operations which arrive at a terminal device for telephony over Internet protocol. The method includes, for example, comparing a received identification of a calling subscriber with corresponding entries of a communication partner file of a called subscriber, and providing a procedure to handle the incoming call in the communication partner file, ~~the communications controller arranges for a procedure for handling the incoming call that is provided for this case to be implemented.~~

In the said if the calling subscriber is recognized as a communication partner included in the communication partner file there may be stored a detailed procedure for handling incoming calls for each communication

partner, ~~there is including a specific account of the exact procedure. Since, however, a, and if the calling subscriber is not recognized as included in the communication partner file usually contains considerably more communication partner data records than different ways of handling incoming calls, it may also contain for each storage communication partner a pointer which points to a file which is assigned to this pointer and contains detailed particulars on how to handle incoming calls., providing a procedure to handle the incoming call.~~

For terminal devices which can be connected in different network areas, for example for portable terminal devices, a particularly advantageous embodiment comprises that the communications controller is realized in the terminal device. This ensures that the communication partner file and the communications controller are available independently of the network area in which the terminal device is connected. In the case of such an embodiment, the terminal device must be in the switched on operating state or be put into this operating state when there is an incoming communication operation. If the terminal device is a computer, for example, it must consequently always be in the switched on operating state if incoming communication operations are to be handled, or in a power saving state which at least permits the detection of incoming calls and also allows the terminal device to be put into the active operating state when there is an incoming call.

Another favorable development of a communications controller is realized in a device assigned to an Internet protocol network to which the terminal device for telephony over Internet protocol can be connected, the incoming communication operations of which are to be handled by the communications controller. In such a case, the handling of incoming calls for a terminal device is ensured even if the terminal device is

~~switched off or is temporarily not been operated on the
Internet protocol network.~~

5 ~~Such a device assigned to an Internet protocol network
may be realized, for example, in the area of a
gatekeeper device of an Internet protocol network
subarea. If appropriate, it is possible to use for this
purpose the same hardware device with which the
gatekeeper function is also realized by using the
10 corresponding software.~~

15 ~~The said device which is assigned to an Internet
protocol network and within which the communications
controller can be realized may also be a proxy which
represents a representative function for terminal
15 devices for telephony over Internet protocol which can
be connected to the said protocol network.~~

20 ~~If a communications controller according to the
invention is realized in a proxy with a representative
function for terminal devices, a terminal device can,
if it leaves the active operating state, for example is
switched off, for example transmit to the gatekeeper
responsible for the terminal device a message arranging
25 for the gatekeeper to forward to the proxy calls
arriving for the to the terminal device. In the
situation mentioned it is also possible for the proxy
to arrange for the gatekeeper to forward to the proxy
calls arriving for the terminal device. For this
30 purpose, the proxy may, for example, receive from the
terminal device a message which indicates whether the
terminal device is available for incoming calls. There
is also the possibility that the proxy always checks
after a certain period of time or at certain points in
35 time the availability of terminal devices for incoming
calls, in order that, if they are unavailable, the
gatekeeper is informed that calls arriving for this
terminal device are to be forwarded to the proxy.~~

~~It is particularly favorable if, without requesting them, the proxy receives messages concerning changes in state with respect to the availability of terminals and if the proxy additionally checks from time to time the availability of the terminals. This makes it possible to ensure that, even if there is no message concerning a change in state, this change in state is registered after a certain time.~~ **BRIEF DESCRIPTION OF THE DRAWINGS**

The invention is explained in more detail below on the basis of an exemplary embodiment with reference to the figures.

Figure 1 shows an exemplary embodiment of a flow diagram for realizing a selective call diversion as a proxy function in an H.323 network.

Figure 2 shows an exemplary embodiment of an H.323 proxy used in the method according to figure 1 in a schematic block representation of an extended protocol layer model (protocol stack).

Figure 3 shows a partial detail of a communications network in accordance with the standard ITU-T H.323 with endpoints, a gatekeeper function, a database and a proxy function in a schematic block representation.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The invention relates to a communications controller for calls arriving at a terminal device which operates in accordance with the telephony over Internet protocol, an identification of the calling subscriber or terminal being received along with the incoming calls. Calls directed to a terminal device for telephony over Internet protocol are usually put through to the called terminal device by an Internet protocol network, i.e. a data network operating on the basis of an Internet protocol, which operates for example in accordance with the standard ITU-T H.323. Provided in the called terminal device is a communications controller, for which there is an established procedure for handling incoming calls. In the simplest case, incoming calls are always put

through to be taken by a called subscriber. However, the subscriber may also provide that incoming calls are forwarded to another terminal or to a spoken-message and/or voice-recording device. The handling of incoming calls is in this case independent of the calling subscriber.

The present invention discloses an improved communications controller for communication operations which are directed to a terminal device for telephony over Internet protocol.

With each incoming call, a communications controller compares a received identification of the calling subscriber with the corresponding entries in a communication partner file of the called subscriber, and inquires about a procedure for handling incoming calls that is stored for the calling subscriber in the communication partner file. If the calling subscriber is stored as a communication partner in the communication partner file, and consequently there is a procedure for handling the incoming call stored in the communication partner file, the communications controller according to the invention arranges for this stored procedure for handling the incoming call to be implemented. If the calling subscriber is not recognized as included in the communication partner file, the communications controller arranges for a procedure for handling the incoming call that is provided for this case to be implemented.

In the communication partner file, there may be stored a detailed procedure for handling incoming calls for each communication partner, including a specified account of the exact procedure. Since, however, a communication partner file usually includes considerably more communication partner data records than different ways of handling incoming calls, it may also include for each storage communication partner a pointer which points to a file which is assigned to this pointer and contains detailed particulars on how to handle incoming calls.

For terminal devices which can be connected in different network areas, for example for portable terminal devices, an advantageous embodiment comprises a communications controller in the terminal device.

5 This ensures that the communication partner file and the communications controller are available independently of the network area in which the terminal device is connected. In the case of such an embodiment, the terminal device is in the switched-on

10 operating state or put into the operating state when there is an incoming communication operation. If the terminal device is a computer, for example, it is consequently in the switched-on operating state if incoming communication operations are to be handled, or

15 in a power-saving state which at least permits the detection of incoming calls and also allows the terminal device to be put into the active operating state when there is an incoming call.

Another embodiment of a communications controller

20 is includes a device assigned to an Internet protocol network to which the terminal device for telephony over Internet protocol can be connected, the incoming communication operations of which are to be handled by the communications controller. In such a case, the

25 handling of incoming calls for a terminal device is ensured even if the terminal device is switched off or is temporarily not been operated on the Internet protocol network.

Such a device assigned to an Internet protocol

30 network may be realized, for example, in the area of a gatekeeper device of an Internet protocol network subarea. If appropriate, it is possible to use the same hardware device with which the gatekeeper function is also realized by using the corresponding software.

35 The device which is assigned to an Internet protocol network and within which the communications controller can be realized may also be a proxy which represents a representative function for terminal devices for telephony over Internet protocol which can

40 be connected to the said protocol network.

If a communications controller according to the invention is realized in a proxy with a representative function for terminal devices, a terminal device can, if it leaves the active operating state, for example is switched off, for example transmit to the gatekeeper responsible for the terminal device a message arranging for the gatekeeper to forward to the proxy calls arriving for the to the terminal device. In the situation mentioned it is also possible for the proxy to arrange for the gatekeeper to forward to the proxy calls arriving for the terminal device. For this purpose, the proxy may, for example, receive from the terminal device a message which indicates whether the terminal device is available for incoming calls. There is also the possibility that the proxy always checks after a certain period of time or at certain points in time the availability of terminal devices for incoming calls, in order that, if they are unavailable, the gatekeeper is informed that calls arriving for this terminal device are to be forwarded to the proxy.

It also favorable if, without requesting them, the proxy receives messages concerning changes in state with respect to the availability of terminals and if the proxy additionally checks from time to time the availability of the terminals. This makes it possible to ensure that, even if there is no message concerning a change in state, this change in state is registered after a certain time.

To allow the representation of figure 1 to be explained in a more intelligible way, firstly the H.323 proxy PROXI according to figure 2 and the H.323 communications network according to figure 3 are described.

Communication networks H.323 Net, as represented in broad outline broadly in figure 3, are known in principle. The communications network H.323 Net shown in figure 3 has a number of endpoints A, B, C, D and E, a gatekeeper function GK, a proxy function PROXI and a database DB. A proxy function PROXI, like a gatekeeper function GK, is a logical function within a

communications network H.323 Net. A gatekeeper function GK is a logical function for performing standard functions such as address resolution and bandwidth management. Address resolution means here
5 ~~that~~ refers to a calling endpoint D ~~sends~~ sending to the gatekeeper an alias address of an endpoint E to be called and ~~receives~~ received from the gatekeeper GK the transport address, that is the Internet protocol address and the port number. The gatekeeper GK knows
10 the volume of traffic with respect to real-time applications within the network area for which it is responsible. If a calling endpoint D sends to the gatekeeper GK a request for a connection with a certain bandwidth, the gatekeeper compares the requested
15 bandwidth with the available bandwidth and, depending on the result of the comparison, sends a message to the calling endpoint A. The network shown in figure 3 differs from the known standard H.323 network by having a database DB for providing communication partner files
20 and a special proxy function PROXI. An embodiment of such a proxy function PROXI is explained in more detail on the basis of an exemplary embodiment of a method according to the invention with reference to figure 1. The structure of such a proxy function PROXI is
25 presented below on the basis of an extended protocol layer model with reference to figure 2.

In figure 2, an exemplary embodiment of an H.323 proxy PROXI is represented in a schematic block representation in the form of an extended protocol
30 layer model.

As usual in networks conforming to ITU-T H.323, the communication of the H.323 proxy PROXI is based on the Internet protocol IP. On the basis of the Internet protocol IP, the protocol stack of the signaling that
35 is handling the call control is represented in the center of figure 2.

On the basis of the Internet protocol IP and the signaling protocol TCP, a function module H.225.0 conforming to the protocol ITU-T H.225.0 is provided
40 here for the signaling of the basic call control in

H.323 networks. Examples of messages of this function module H.225.0 are SETUP and CONNECT.

Also on the basis of the signaling protocol TCP, a function module H.245 conforming to the control protocol ITU-T H.245 is provided. One of the purposes of this function module H.245 is for exchanging TerminalCapability messages, that is for submitting and receiving information with respect to terminal capabilities. What is more, this function module H.245 serves for establishing task allocations, such as master and slave functions, and for opening and closing logical channels serving for user data transmission.

On top of the function module H.225.0 there are function modules of additional facility controllers, such as for example a function module H.450.1 for realizing a specific function and a function module H.450.3 for realizing a call diversion function of the standard ITU-T H.450.

In figure 2, a user data stack is represented to the left of the signaling stack just described. This user data stack is also based on the Internet protocol IP, on which there is UDP and on that, in turn, a real-time protocol RTP. In addition to the real-time protocol RTP, the protocol UDP also supports a real-time control protocol RTCP and that part H.225.0 RAS of the control protocol conforming to ITU-T H.225.0 which concerns the areas of registration, administration and status.

On the basis of the real-time protocol RTP, there are codecs or at least decoders for audio and video AUDIO, VIDEO. Such audio codecs AUDIO are designed for example to conform to one of the ITU-T standards G.711, G.723.1, G.728. Audio decoders AUDIO are also defined by ISO MPEG4. ISO MPEG4 also defines corresponding video decoders VIDEO. When decoders conforming to ISO MPEG4 are used, proprietary coders are possibly contained in an H.323 proxy PROXI.

The real-time control protocol RTCP and the codecs or decoders for audio and video AUDIO, VIDEO are controlled by a media controller MEDIA CONTROL, which

is responsible inter alia for the interaction of media input means INPUT-DEVICE, provided in the H.323 proxy PROXI, and a media output means device that are only optionally ~~to be~~ provided in an H.323 proxy PROXI and
5 are therefore not represented. In this respect, the media input means device INPUT-DEVICE are, for example (not shown explicitly in figure 2), cameras for video data, microphones for audio data or interfaces with data sources not ~~contained~~ included in the H.323 proxy
10 PROXI. ~~Output means~~ An output device (not shown explicitly in figure 2) could be, for example, a loudspeaker for audio data or interfaces with the output means device not ~~contained~~ included in the H.323 proxy PROXI, such as printers or mass storage devices.

15 The described stack for user data handling RTP, RTCP, H.225.0, AUDIO, VIDEO and MEDIA CONTROL and the described stack for signaling handling H.245, H.225.0, CONFERENCE CONTROLLING, H.450.2, H.450.4 and H.450.5 are coupled to an application programming interface API
20 via a coordination function COORDINATION FUNCTION. In this case, the coordination function COORDINATION FUNCTION coordinates the interaction of the units in this stack with the application programming interface API.

25 Examples of an application programming interface API are TAPI or CAPI. The application programming interface API switches between application programs applications and the coordination function COORDINATION FUNCTION.

30 In addition to the stacks required for multimedia communication, that is the described stacks for user data handling RTP, RTCP, H.225.0, AUDIO, VIDEO and MEDIA CONTROL and for signaling handling H.245, H.225.0, H.450.1, H.450.3 and H.450..., another
35 function module DB/DB Access is shown on the right-hand side in figure 2. This function module DB/DB Access is not based on the Internet protocol IP but is also coupled via the coordination function COORDINATION FUNCTION and the application programming interface API
40 to applications APPLICATIONS. The function module

DB/DB Access corresponds for example to an interface of the H.323 proxy PROXI with a database server (not shown), which ~~contains~~ includes communication partner files. The function module DB/DB Access may, however, also correspond to an interface with a database ~~contained~~ included in the H.323 proxy PROXI (not shown in figure 2) with communication partner files. If communication partner files are ~~contained~~ included in a database server, it goes without saying that this can also be accessed using signaling based on ITU-T H.450.

The structure of the function module DB/DB Access is not explicitly presented in figure 2, since corresponding industrial standard interfaces are sufficiently known. Such interfaces may be, for example, JDBC (JAVA Database Connectivity) or ODBC (Open Database Connectivity).

Figure 1 shows basic states, events and the message flow between three endpoints A, B and C of a communications network in accordance with the standard ITU-T H.323, a gatekeeper GK, a database DB and a proxy function which is provided in this communications network and is referred to hereafter as the H.323 proxy PROXI. The exemplary embodiment dealt with in figure 1 assumes that a subscriber to which the endpoint B is assigned wishes for a call diversion to the endpoint C for incoming calls from certain points, including endpoint A. In the present case, a terminal provided at the endpoint B is not ready for operation when a call arrives from the endpoint A:

In the initial state, the function H.323 proxy PROXI, the gatekeeper GK, the database DB and terminals (not shown) assigned to the endpoints A and C are respectively in a rest state "idle". A terminal (not shown) assigned to the endpoint B is not in operation.

A subscriber at the endpoint A arranges via the gatekeeper GK for a connection to be set up to an endpoint B. For this purpose, the message SETUP, for example conforming to ITU-T H.225, is transmitted from the endpoint A to the gatekeeper GK, and would usually

be forwarded by the gatekeeper GK to the endpoint B. In the present case, however, the gatekeeper GK receiving the SETUP message recognizes that the addressed destination endpoint B is not registered as available and that a representative address (proxy address) to an H.323 proxy PROXI has been set up for this endpoint in the event of unavailability.

The gatekeeper GK therefore addresses the SETUP message from the endpoint A to this H.323 proxy PROXI. The SETUP message ~~contains~~ includes the address of the originally called endpoint B.

The H.323 proxy PROXI receives the SETUP message and checks which procedure is to be used for handling calls for the endpoint B coming from the endpoint A. For this purpose, the H.323 proxy PROXI sends a request to the database DB.

As mentioned above, the database DB may either form a unit with the device realizing the proxy function PROXI or be spatially separate from it. A remote database DB can be accessed for example via interfaces conforming to JDBC (JAVA Database Connectivity) or ODBC (Open Database Connectivity), but also on the basis of an H.450 signaling. In the database it is checked within the communication partner file of the subscriber to which the endpoint B is assigned how calls arriving from the endpoint A are to be handled in the event of the terminal provided at the endpoint B not being ready for operation. It is possibly first checked for this purpose whether there is an entry with respect to the endpoint A in the communication partner file of the subscriber to which the endpoint B is assigned.

The database DB transmits to the H.323 proxy PROXI the information found in this check: divert calls from endpoint A for endpoint B to endpoint C.

Then, the H.323 proxy PROXI arranges for a corresponding call diversion to be implemented, in the example represented a call diversion conforming to the ITU-T standard H.450.3. Using H.225.0, the H.323 proxy

PROXI transmits for this purpose to the endpoint A a message FACILITY (H.450.3 callReroutingInvoke), invoking the call diversion facility.

5 This message ~~contains~~ includes the address of the call diversion destination. Although the terminal at the endpoint B is not in operation, this call diversion can be executed by the proxy function. The proxy function is provided for realizing this facility with respect to this terminal.

10 Consequently, the proxy function Proxi arranges for the facility message FACILITY (H.450 callReroutingInvoke) for the endpoint B that is not ready for operation. The endpoint A sends in a manner conforming to the ITU-T standard H.450.3 (for example
15 February 1998 edition) and on the basis of H.225.0 a facility message FACILITY (H.450 callReroutingResult) directly to the H.323 proxy PROXI and then arranges, by a message H.225.0 ReleaseComplete to the H.323 proxy PROXI, for the signaling connection between H.323 proxy
20 PROXI and the endpoint A to be released.

The endpoint A transmits to the endpoint C an H.245 TerminalCapabilitySet message with the data of the endpoint A. In a corresponding way, the endpoint C transmits to the endpoint A an H.245
25 TerminalCapabilitySet message with the data of the endpoint C. What is more, the position of the individual parties involved during the call between the endpoints A and C is established in a manner conforming to H.245 by the exchange of Master/SlaveDetermination
30 messages, whereupon a procedure for opening logical channels between the endpoints A and C is executed by means of messages conforming to ITU-T H.245.

Then logical channels are opened between the endpoints A and C, in order for example to transmit
35 audio or video information. What is more, signaling connections exist between the endpoint A and the endpoint C.

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Description

3/pys

10/070944

Communications controller for com
telephony over Internet protocol

English
Translation

5

The invention relates to a communication system for calls arriving at a terminal device in accordance with the telephony protocol, an identification of the calling subscriber or terminal being received along with the incoming calls. Calls directed to a terminal device for telephony over Internet protocol are usually put through to the called terminal device by an Internet protocol network, that is to say a data network operating on the basis of an Internet protocol, which operates for example in accordance with the standard ITU-T H.323. Provided in the called terminal device is a communications controller, for which there is an established procedure for handling incoming calls. In the simplest case, incoming calls are always put through to be taken by a called subscriber. However, the subscriber may also provide that incoming calls are forwarded to another terminal or to a spoken-message and/or voice-recording device. The handling of incoming calls is in this case independent of the calling subscriber.

In the area of private branch exchanges there is a known central communications controller for establishing the procedure for handling calls coming to a terminal. This provides the "selective incoming-call protection" facility, which arranges for a diversion of calls coming from selected subscribers to another terminal or to a spoken-message and/or voice-recording system and puts through incoming calls from other subscribers. Furthermore, it is known from DE 43 30 755 C2, in the case of such central communication controllers, for incoming calls from selected subscribers to be put through to the terminal

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and all other incoming calls to be diverted to another terminal or to a spoken-message and/or voice-recording system.

5 In a PC, and consequently in a terminal for telephony over Internet protocol, there is conventionally a communication partner file, which contains a number of data records with data on communication partners of the subscriber to which the terminal is assigned. Each
10 data record contains an entry for the name of the communication partner and one or more communication addresses. If appropriate, such a data record may also contain additional information on the respective communication partner.

15

The object of the invention is to specify an improved communications controller for communication operations which are directed to a terminal device for telephony over Internet protocol.

20

The invention achieves this object by a communications controller with the features of patent claim 1.

With each incoming call, a communications controller
25 according to the invention compares a received identification of the calling subscriber with the corresponding entries in a communication partner file of the called subscriber and inquires about a procedure for handling incoming calls that is stored for the
30 calling subscriber in the communication partner file. If the calling subscriber is stored as a communication partner in the communication partner file and consequently there is a procedure for handling the incoming call stored in the communication partner file,
35 the communications controller according to the invention arranges for this stored procedure for handling the incoming call to be implemented. If the calling subscriber is not recognized as contained in the communication partner file, the communications

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controller arranges for a procedure for handling the incoming call that is provided for this case to be implemented.

- 5 In the said communication partner file there may be stored a detailed procedure for handling incoming calls for each communication partner, that is including a specified account of the exact procedure. Since, however, a communication partner file usually contains
10 considerably more communication partner data records than different ways of handling incoming calls, it may also contain for each storage communication partner a pointer which points to a file which is assigned to this pointer and contains detailed particulars on how
15 to handle incoming calls.

- For terminal devices which can be connected in different network areas, for example for portable terminal devices, a particularly advantageous
20 embodiment comprises that the communications controller is realized in the terminal device. This ensures that the communication partner file and the communications controller are available independently of the network area in which the terminal device is connected. In the
25 case of such an embodiment, the terminal device must be in the switched-on operating state or be put into this operating state when there is an incoming communication operation. If the terminal device is a computer, for example, it must consequently always be in the
30 switched-on operating state if incoming communication operations are to be handled, or in a power-saving state which at least permits the detection of incoming calls and also allows the terminal device to be put into the active operating state when there is an
35 incoming call.

Another favorable development of a communications controller is realized in a device assigned to an Internet protocol network to which the terminal device

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for telephony over Internet protocol can be connected, the incoming communication operations of which are to be handled by the communications controller. In such a case, the handling of incoming calls for a terminal
5 device is ensured even if the terminal device is switched off or is temporarily not been operated on the Internet protocol network.

Such a device assigned to an Internet protocol network
10 may be realized, for example, in the area of a gatekeeper device of an Internet protocol network subarea. If appropriate, it is possible to use for this purpose the same hardware device with which the gatekeeper function is also realized by using the
15 corresponding software.

The said device which is assigned to an Internet protocol network and within which the communications controller can be realized may also be a proxy which
20 represents a representative function for terminal devices for telephony over Internet protocol which can be connected to the said protocol network.

If a communications controller according to the
25 invention is realized in a proxy with a representative function for terminal devices, a terminal device can, if it leaves the active operating state, for example is switched off, for example transmit to the gatekeeper responsible for the terminal device a message arranging
30 for the gatekeeper to forward to the proxy calls arriving for the to the terminal device. In the situation mentioned it is also possible for the proxy to arrange for the gatekeeper to forward to the proxy calls arriving for the terminal device. For this
35 purpose, the proxy may, for example, receive from the terminal device a message which indicates whether the terminal device is available for incoming calls. There is also the possibility that the proxy always checks after a certain period of time or at certain points in

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time the availability of terminal devices for incoming calls, in order that, if they are unavailable, the gatekeeper is informed that calls arriving for this terminal device are to be forwarded to the proxy.

5

It is particularly favorable if, without requesting them, the proxy receives messages concerning changes in state with respect to the availability of terminals and if the proxy additionally checks from time to time the
10 availability of the terminals. This makes it possible to ensure that, even if there is no message concerning a change in state, this change in state is registered after a certain time.

15 The invention is explained in more detail below on the basis of an exemplary embodiment with reference to the figures.

Figure 1 shows an exemplary embodiment of a flow
20 diagram for realizing a selective call diversion as a proxy function in an H.323 network.

Figure 2 shows an exemplary embodiment of an H.323 proxy used in the method according to figure 1 in a
25 schematic block representation of an extended protocol layer model (protocol stack).

Figure 3 shows a partial detail of a communications network in accordance with the standard ITU-T H.323
30 with endpoints, a gatekeeper function, a database and a proxy function in a schematic block representation.

To allow the representation of figure 1 to be explained in a more intelligible way, firstly the H.323 proxy
35 PROXI according to figure 2 and the H.323 communications network according to figure 3 are described.

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Communication networks H.323 Net, as represented in broad outline in figure 3, are known in principle. The communications network H.323 Net shown in figure 3 has a number of endpoints A, B, C, D and E, a gatekeeper function GK, a proxy function PROXI and a database DB.

5 A proxy function PROXI, like a gatekeeper function GK, is a logical function within a communications network H.323 Net. A gatekeeper function GK is a logical function for performing standard functions such as

10 address resolution and bandwidth management. Address resolution means here that a calling endpoint D sends to the gatekeeper an alias address of an endpoint E to be called and receives from the gatekeeper GK the transport address, that is the Internet protocol

15 address and the port number. The gatekeeper GK knows the volume of traffic with respect to real-time applications within the network area for which it is responsible. If a calling endpoint D sends to the gatekeeper GK a request for a connection with a certain

20 bandwidth, the gatekeeper compares the requested bandwidth with the available bandwidth and, depending on the result of the comparison, sends a message to the calling endpoint A. The network shown in figure 3 differs from the known standard H.323 network by having

25 a database DB for providing communication partner files and a special proxy function PROXI. An embodiment of such a proxy function PROXI is explained in more detail on the basis of an exemplary embodiment of a method according to the invention with reference to figure 1.

30 The structure of such a proxy function PROXI is presented below on the basis of an extended protocol layer model with reference to figure 2.

In figure 2, an exemplary embodiment of an H.323 proxy PROXI is represented in a schematic block representation in the form of an extended protocol layer model.

35

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As usual in networks conforming to ITU-T H.323, the communication of the H.323 proxy PROXI is based on the Internet protocol IP. On the basis of the Internet protocol IP, the protocol stack of the signaling that
5 is handling the call control is represented in the center of figure 2.

On the basis of the Internet protocol IP and the signaling protocol TCP, a function module H.225.0
10 conforming to the protocol ITU-T H.225.0 is provided here for the signaling of the basic call control in H.323 networks. Examples of messages of this function module H.225.0 are SETUP and CONNECT.

15 Also on the basis of the signaling protocol TCP, a function module H.245 conforming to the control protocol ITU-T H.245 is provided. One of the purposes of this function module H.245 is for exchanging TerminalCapability messages, that is for submitting and
20 receiving information with respect to terminal capabilities. What is more, this function module H.245 serves for establishing task allocations, such as master and slave functions, and for opening and closing logical channels serving for user data transmission.

25 On top of the function module H.225.0 there are function modules of additional facility controllers, such as for example a function module H.450.1 for realizing a specific function and a function module
30 H.450.3 for realizing a call diversion function of the standard ITU-T H.450.

In figure 2, a user data stack is represented to the left of the signaling stack just described. This user
35 data stack is also based on the Internet protocol IP, on which there is UDP and on that, in turn, a real-time protocol RTP. In addition to the real-time protocol RTP, the protocol UDP also supports a real-time control protocol RTCP and that part H.225.0 RAS of the control

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protocol conforming to ITU-T H.225.0 which concerns the areas of registration, administration and status.

On the basis of the real-time protocol RTP, there are
5 codecs or at least decoders for audio and video AUDIO, VIDEO. Such audio codecs AUDIO are designed for example to conform to one of the ITU-T standards G.711, G.723.1, G.728. Audio decoders AUDIO are also defined by ISO MPEG4. ISO MPEG4 also defines corresponding
10 video decoders VIDEO. When decoders conforming to ISO MPEG4 are used, proprietary coders are possibly contained in an H.323 proxy PROXI.

The real-time control protocol RTCP and the codecs or
15 decoders for audio and video AUDIO, VIDEO are controlled by a media controller MEDIA CONTROL, which is responsible inter alia for the interaction of media input means INPUT-DEVICE, provided in the H.323 proxy PROXI, and media output means that are only optionally
20 to be provided in an H.323 proxy PROXI and are therefore not represented. In this respect, media input means INPUT-DEVICE are, for example (not shown explicitly in figure 2), cameras for video data, microphones for audio data or interfaces with data
25 sources not contained in the H.323 proxy PROXI. Output means (not shown explicitly in figure 2) could be, for example, a loudspeaker for audio data or interfaces with output means not contained in the H.323 proxy PROXI, such as printers or mass storage devices.

30 The described stack for user data handling RTP, RTCP, H.225.0, AUDIO, VIDEO and MEDIA CONTROL and the described stack for signaling handling H.245, H.225.0, CONFERENCE CONTROLLING, H.450.2, H.450.4 and H.450.5
35 are coupled to an application programming interface API via a coordination function COORDINATION FUNCTION. In this case, the coordination function COORDINATION FUNCTION coordinates the interaction of the units in

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this stack with the application programming interface API.

Examples of an application programming interface API
5 are TAPI or CAPI. The application programming interface API switches between application programs applications and the coordination function COORDINATION FUNCTION.

10 In addition to the stacks required for multimedia communication, that is the described stacks for user data handling RTP, RTCP, H.225.0, AUDIO, VIDEO and MEDIA CONTROL and for signaling handling H.245, H.225.0, H.450.1, H.450.3 and H.450..., another
15 function module DB/DB Access is shown on the right-hand side in figure 2. This function module DB/DB Access is not based on the Internet protocol IP but is also coupled via the coordination function COORDINATION FUNCTION and the application programming interface API
20 to applications APPLICATIONS. The function module DB/DB Access corresponds for example to an interface of the H.323 proxy PROXI with a database server (not shown), which contains communication partner files. The function module DB/DB Access may, however, also
25 correspond to an interface with a database contained in the H.323 proxy PROXI (not shown in figure 2) with communication partner files. If communication partner files are contained in a database server, it goes without saying that this can also be accessed using
30 signaling based on ITU-T H.450.

The structure of the function module DB/DB Access is not explicitly presented in figure 2, since corresponding industrial standard interfaces are sufficiently known. Such interfaces may be, for
35 example, JDBC (JAVA Database Connectivity) or ODBC (Open Database Connectivity).

Figure 1 shows basic states, events and the message flow between three endpoints A, B and C of a

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communications network in accordance with the standard
ITU-T H.323, a gatekeeper GK, a database DB and a proxy
function which is provided in this communications
network and is referred to hereafter as the H.323 proxy
5 PROXI. The exemplary embodiment dealt with in figure 1
assumes that a subscriber to which the endpoint B is
assigned wishes for a call diversion to the endpoint C
for incoming calls from certain points, including
endpoint A. In the present case, a terminal provided
10 at the endpoint B is not ready for operation when a
call arrives from the endpoint A:

In the initial state, the function H.323 proxy PROXI,
the gatekeeper GK, the database DB and terminals (not
15 shown) assigned to the endpoints A and C are
respectively in a rest state "idle". A terminal (not
shown) assigned to the endpoint B is not in operation.

A subscriber at the endpoint A arranges via the
20 gatekeeper GK for a connection to be set up to an
endpoint B. For this purpose, the message SETUP, for
example conforming to ITU-T H.225, is transmitted from
the endpoint A to the gatekeeper GK, and would usually
be forwarded by the gatekeeper GK to the endpoint B.
25 In the present case, however, the gatekeeper GK
receiving the SETUP message recognizes that the
addressed destination endpoint B is not registered as
available and that a representative address (proxy
address) to an H.323 proxy PROXI has been set up for
30 this endpoint in the event of unavailability.

The gatekeeper GK therefore addresses the SETUP message
from the endpoint A to this H.323 proxy PROXI. The
SETUP message contains the address of the originally
35 called endpoint B.

The H.323 proxy PROXI receives the SETUP message and
checks which procedure is to be used for handling calls
for the endpoint B coming from the endpoint A. For

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this purpose, the H.323 proxy PROXI sends a request to the database DB.

- As mentioned above, the database DB may either form a unit with the device realizing the proxy function PROXI or be spatially separate from it. A remote database DB can be accessed for example via interfaces conforming to JDBC (JAVA Database Connectivity) or ODBC (Open Database Connectivity), but also on the basis of an H.450 signaling. In the database it is checked within the communication partner file of the subscriber to which the endpoint B is assigned how calls arriving from the endpoint A are to be handled in the event of the terminal provided at the endpoint B not being ready for operation. It is possibly first checked for this purpose whether there is an entry with respect to the endpoint A in the communication partner file of the subscriber to which the endpoint B is assigned.
- The database DB transmits to the H.323 proxy PROXI the information found in this check: divert calls from endpoint A for endpoint B to endpoint C.

- Then, the H.323 proxy PROXI arranges for a corresponding call diversion to be implemented, in the example represented a call diversion conforming to the ITU-T standard H.450.3. Using H.225.0, the H.323 proxy PROXI transmits for this purpose to the endpoint A a message FACILITY (H.450.3 callReroutingInvoke), invoking the call diversion facility.

- This message contains the address of the call diversion destination. Although the terminal at the endpoint B is not in operation, this call diversion can be executed by the proxy function. The proxy function is provided for realizing this facility with respect to this terminal.

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Consequently, the proxy function Proxi arranges for the facility message FACILITY (H.450 callReroutingInvoke) for the endpoint B that is not ready for operation. The endpoint A sends in a manner conforming to the
5 ITU-T standard H.450.3 (for example February 1998 edition) and on the basis of H.225.0 a facility message FACILITY (H.450 callReroutingResult) directly to the H.323 proxy PROXI and then arranges, by a message H.225.0 ReleaseComplete to the H.323 proxy PROXI, for
10 the signaling connection between H.323 proxy PROXI and the endpoint A to be released.

The endpoint A transmits to the endpoint C an H.245 TerminalCapabilitySet message with the data of the
15 endpoint A. In a corresponding way, the endpoint C transmits to the endpoint A an H.245 TerminalCapabilitySet message with the data of the endpoint C. What is more, the position of the individual parties involved during the call between the
20 endpoints A and C is established in a manner conforming to H.245 by the exchange of Master/SlaveDetermination messages, whereupon a procedure for opening logical channels between the endpoints A and C is executed by means of messages conforming to ITU-T H.245.

25

Then logical channels are opened between the endpoints A and C, in order for example to transmit audio or video information. What is more, signaling connections exist between the endpoint A and the endpoint C.

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Patent claims

1. A communications controller for communication operations which arrive at a terminal device for telephony over Internet protocol, with a device
 - which, with each incoming call, compares a received identification of the calling subscriber with corresponding entries of a communication partner file of the called subscriber,
 - which arranges for a procedure for handling the incoming call that is stored for this communication partner in this communication partner file to be implemented if the calling subscriber is recognized as a communication partner contained in the communication partner file, and
 - which, if the calling subscriber is not recognized as contained in the communication partner file, arranges for a procedure for handling the incoming call that is provided for this case to be implemented.
2. The communications controller as claimed in claim 1, characterized in that it is realized in the terminal device.
3. The communications controller as claimed in claim 1, characterized in that the communications controller is realized in a device which is assigned to an IP network and to which the terminal device for telephony over Internet protocol can be connected.
4. The communications controller as claimed in claim 3, the device assigned to an IP network being a proxy module with a representative function for the terminal devices for telephony over Internet protocol which can be connected to the IP network.

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Abstract

A description is given of a communications controller for communication operations which arrive at a terminal device for telephony over Internet protocol. The communications controller contains a device which, with each incoming call, compares a received identification of the calling subscriber with entries of a communication partner file of the called subscriber, which arranges for a procedure for handling the incoming call that is stored in this file to be implemented, and which, if the calling subscriber is not recognized as contained in the communication partner file, arranges for a procedure for handling the incoming call that is provided for this case to be implemented.

(Figure 1)

FIG 1

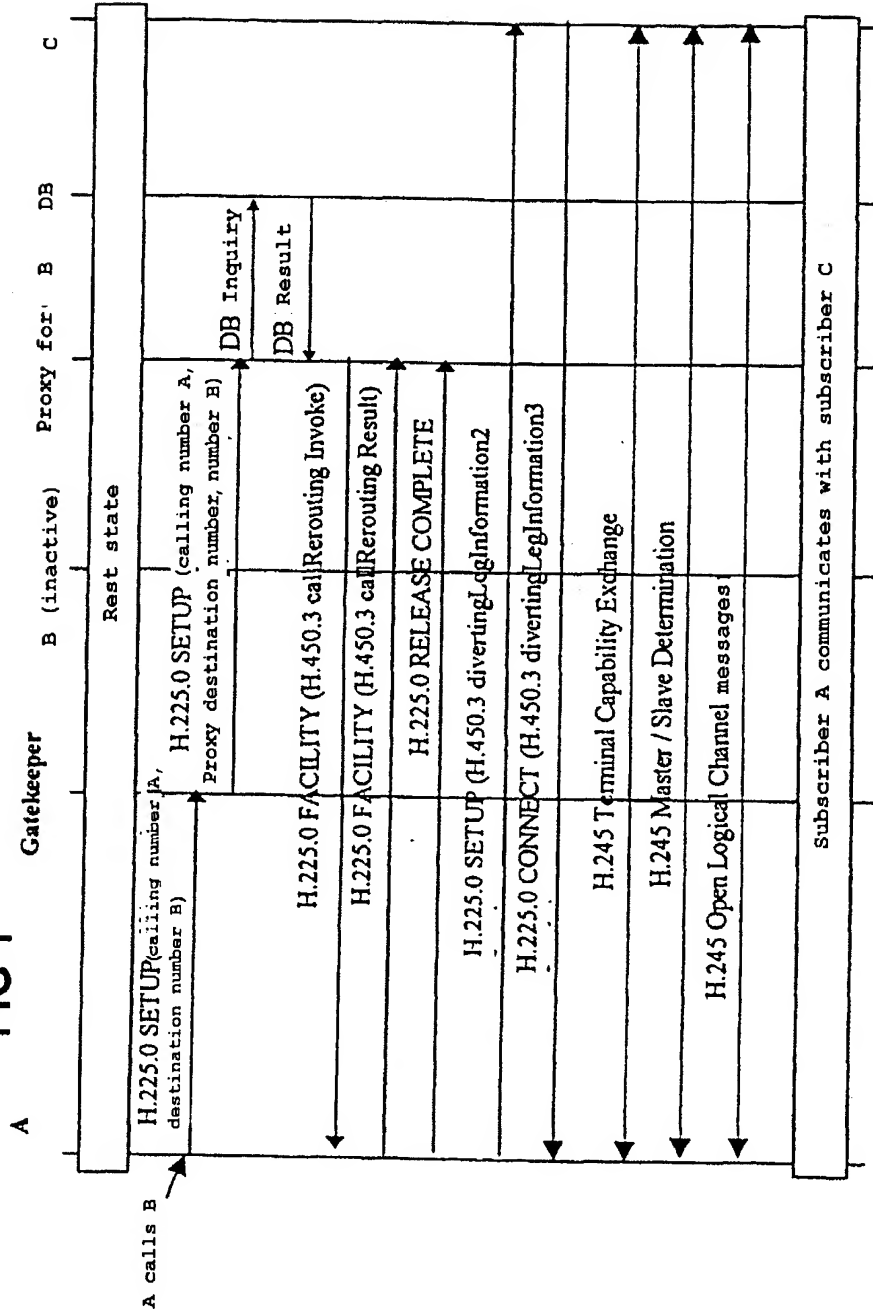
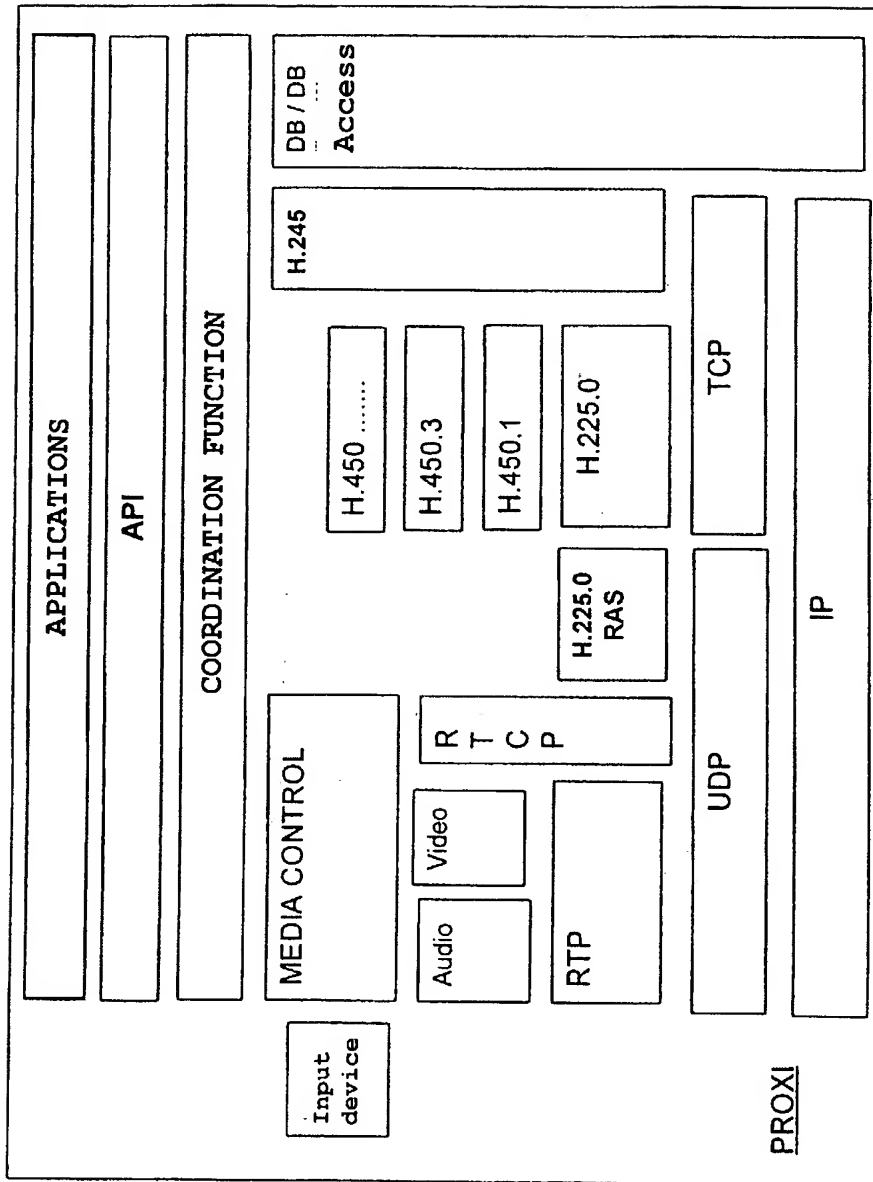
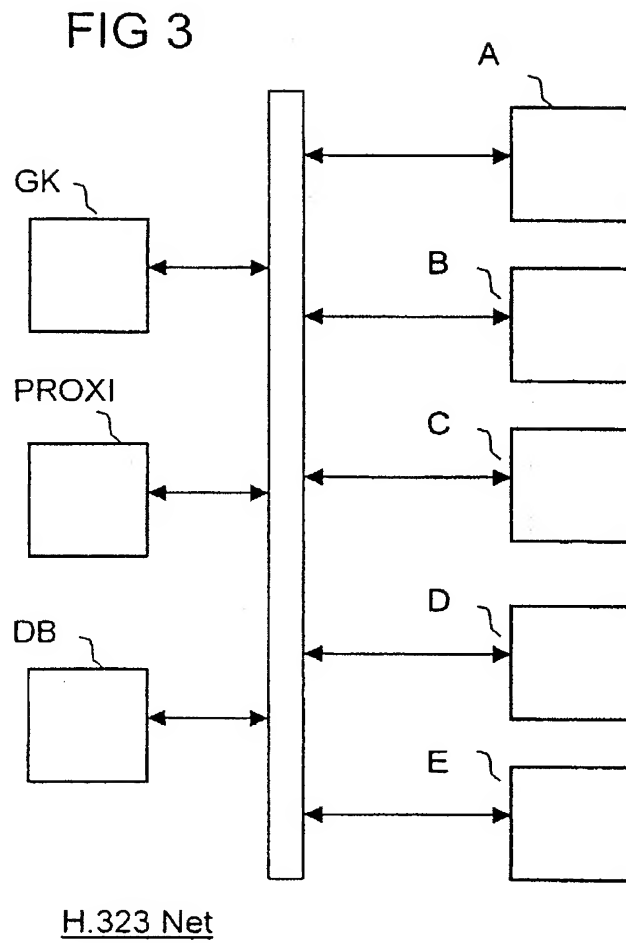


FIG 2





Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

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I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Kommunikationssteuerung für die
Kommunikation mit Telefonie-über-
Internetprotokoll

Communications control device for the
communication with a telephony over
internet protocol

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)

(check one)

☐ hier beigefügt ist.

☐ is attached hereto.

☒ am 07.09.2000 als

☒ was filed on 07.09.2000 as

PCT internationale Anmeldung

PCT international application

PCT Anmeldungsnummer PCT/DE00/03115

PCT Application No. PCT/DE00/03115

eingereicht wurde und am

and was amended on

abgeändert wurde (falls tatsächlich abgeändert).

(if applicable)

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I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

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Prior foreign applications
Priorität beansprucht

Priority Claimed

19943777.7

DE

13.09.1999

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(Number)

(Country)

(Day Month Year Filed)

Yes

No

(Nummer)

(Land)

(Tag Monat Jahr eingereicht)

Ja

Nein

(Number)

(Country)

(Day Month Year Filed)

☐

☐

(Nummer)

(Land)

(Tag Monat Jahr eingereicht)

Yes

No

Ja

Nein

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(Country)

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PCT/DE00/03115

(Application Serial No.)
(Anmeldeseriennummer)

07.09.2000

(Filing Date D, M, Y)
(Anmeldedatum T, M, J)

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(Status)
(patentiert, anhängig,
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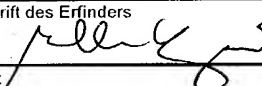
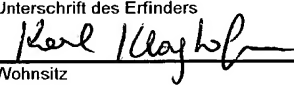
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(Supply similar information and signature for third and subsequent joint inventors).

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Unterschrift des Erfinders	Datum	Inventor's signature	Date
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Voller Name des sechsten Miterfinders:		Full name of sixth joint inventor:	
Unterschrift des Erfinders	Datum	Inventor's signature	Date
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Staatsangehörigkeit		Citizenship	
Postanschrift		Post Office Address	

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).